Sigma Controls, Inc.
PROCESS CONTROLS AND INSTRUMENTATION

USER MANUAL

MICROPROCESSOR BASED LEVEL TRANSMITTERS

217 S. Fifth Street ♦ Perkasie, PA 18944
PH: 215-257-3412 ♦ FAX: 215-257-3416

WEBSITE: Sigmacontrols.com
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SIGMA CONTROLS, INC.

BACKGROUND

Sigma Controls, Inc., located in Perkasie, Pennsylvania manufactures a wide variety of instrumentation and controls for water and wastewater and related industries.

PRODUCTS COVERED BY THIS MANUAL

SUBMERSIBLE DEVICES

Model 5000MP

Model 6000MP

Model 6100MP

Model 6200MP

Model 7000MP

Model 8000MP

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SIGMA CONTROLS, INC.

1.0 CONTACT INFORMATION

PHYSICAL ADDRESS: 217 South Fifth Street
Perkasie, Pennsylvania 18944

TELEPHONE: 215-257-3412
FAX: 215-257-3416

WEBSITE: www.sigmacontrols.com

ONLINE ORDERING: Available on Website

CREDIT CARDS: American Express, Mastercard, Visa

E MAIL:

Accounting: dottie@sigmacontrols.com

Order Entry: janice@sigmacontrols.com

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les@sigmacontrols.com

2.0 DESCRIPTION OF PRODUCTS

2.1 PRODUCT OVERVIEW

All Sigma Controls' submersible capable transmitters (except Model 7000MP) are constructed of 316SS and a variety of elastomers including Teflon®, Viton®, PVC, Buna 'N' and Polyurethane depending on model and body style.

Primary level sensing is achieved by the use of a solid state, piezo resistive, silicone pressure sensor in a Wheatstone bridge configuration.

The sensor is fitted into a 316SS sensor body and isolated from the measured media with an integral diaphragm seal, backfilled with a thermally stable silicone oil.

The output of the primary sensor is conditioned to a high level output by the integral microprocessor based electronic board. The use of a microprocessor allows for significant performance improvements over earlier analog designs by correcting all inherent inaccuracies including temperature effects, linearity, hysteresis, and repeatability. Accuracy to better than 0.1% is possible.

Active temperature compensation is achieved with an internal thermister style temperature element which provides information to the microprocessor for correction of media temperature effects.

The use of a microprocessor further permits a wide range of analog and digital data output signals for telemetry or SCADA applications (see data sheets for detailed information).

2.2 CALIBRATION

A) Sigma Controls' sensors are factory calibrated to NIST standards to the user's specific requirements and are shipped with a Certificate of Calibration.

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3.0 OPTIONS AND ACCESSORIES

3.1 CABLE SUPPORT BRACKET ('SB', 'SK' Option)

All transducers are available with a cable support bracket which is attached to the rear (cable end) of the unit and permits the installer to attach a support rope or steel cable. This procedure removes strain from the electrical cable and also makes removal easier.

3.2 CONDUIT ADAPTOR ('CD' Option)

The 'CD' option provides a 316SS ½" NPTF adaptor, which allows the attachment of a user supplied conduit over the factory cable to allow conduit connection in a non-submersible application or a rigid conduit for ease of installation in shallow submersible applications.

3.3 NOSE CONES (Model 6000, 7000, 8000)

The nose cone is provided in 316SS or PVC dependent on model and is primarily for protection of the process diaphragm. In the 6000 model the nose cone can be unscrewed to provide a ½" NPT female connection permitting direct to pipe attachment or attachment of a weight. The 6100 and 6200 models do not utilize nose cones.

3.4 TRANSIENT SUPPRESSION

All Sigma 'MP' devices incorporate integral transient suppression in the form of 3 'transorbs' integrated on to the internal circuit board.

"It is strongly recommended that additional transient suppression should be provided external to the instrument, especially in areas with a history of lightning strike damage. Each data sheet details available external transient suppressors."

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3.5 OUTPUT SIGNAL CHOICES

The standard output signal is 4/20MA two-wire @ 24 VDC nominal. Alternative outputs are as follows:

1) 4/20Ma and MVNET (Sigma proprietary RS485 output)
2) 4/20Ma and ASCII
3) 4/20Ma and MODBUS®. MODBUS output requires the use of an external module, Sigma part number MODBUS ADAPTOR
4) 4/20Ma or any of the above digital outputs

Both temperature and level information are available in the ASCII format. Consult factory for additional information.

3.6 STAND OFF OPTION

The 'stand off' option 'SO' is available on the model 6100 only. The 'SO' option allows the sensor to be lowered to the bottom of the vessel into which it is lowered, thus supporting it.

NOTE: The stand off option is not recommended in lift station applications where the condition of the bottom of the wet well in unknown or the instrument can be installed below the level of the pump inlet. Consult factory for more information.

3.7 WALL MOUNT SUPPORT BRACKET ('WB' Option)

The wall mount support bracket provides a short strain relieving conduit assembly which allows for the use of conduit clamps at the top of the installation to support the transducer.

3.8 SUPPORT CABLE ('WC' Option)

316SS stranded aircraft grade cable can be supplied for use with SB brackets to provide a tension relieving support. The SS cable also facilitates removal of the device without the need to 'pull' on the electrical cable.

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3.9 DESICCANT ENCLOSURE

All of Sigma Controls' level transducers are "gauge pressure" units. They are referenced to atmospheric pressure through the custom manufactured factory supplied cable.

The single largest cause of premature instrument failure is the ingress of moisture vapors into the body of the unit, extreme care must be taken to eliminate this possibility.

Although Sigma Controls' standard cable does not use any 'tubes' to allow pressure equalization, it is still possible for moisture to enter the sensor.

If a transition is made in the field to twisted shielded pair (TSP) to extend the cable, it is recommended that a Sigma RDE (Rechargeable Desiccant Enclosure) be used for this purpose.

The RDE comprises a Nema 4X junction box, rechargeable desiccant pack and a terminal block. The enclosure is vented to atmosphere through a Gortex filter. Cable entry and exit fittings are provided.

Under no circumstance should the factory cable be spliced. An RDE or Nema 4X junction box should be used.

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4.0 MAINTENANCE AND INSTALLATION CONSIDERATIONS

4.1 SUBMERSIBLE INSTALLATIONS

Most submersible applications simply suspend the transducer from its own cable or one of the several support methods discussed earlier.

The transducer should never be 'strapped' to a well 'pickup pipe' or to a ladder or other support since removal of the transducer may require removal of the attaching device. Additionally, 'strapping' the support cable may cause an abrasion or cut which will ultimately allow liquid to enter the instrument.

Stilling wells (tubes, anchored to the wall of the vessel/well) are ideal in well water or clean water applications to contain the transducer and prevent damage due to turbulence.

Careful consideration should, however, be given to stilling wells in sewage applications. In wet wells containing high grease volumes the stilling well allows the grease to come out of solution and begin to harden at the air/water interface. Over time this build-up may well prevent the transducer from being removed without incurring serious damage.

An alternate method for turbulent wet wells is to use a cable supported anchor or weight and to loosely strap the transducer cable to the support cable. This method allows easy removal.

4.2 CABLE PROTECTION

The standard 4 conductor polyurethane jacket is extremely flexible and may be bent in a relatively tight radius, however, care must be taken not to 'pinch' the cable and prevent the atmospheric reference.

4.3 LOOP WIRING

Standard cable contains 4 conductors, red (+), black (-), yellow and blue (data). For normal 4/20Ma two-wire installations, only the black and red wires should be used. **Care must be taken that 24VDC is not applied to the blue and yellow data wires as serious damage to the unit could occur.**

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4.4 1-5VDC OUTPUT

This is available by using a signal converter part # CONVERTER. This inexpensive device contains a precision 250 OHM resister in a DIN rail mount terminal assembly and facilitates using any of our 2-wire 4/20Ma devices for 3-wire 1-5 VDC applications or retrofit.

4.5 POSITION EFFECTS

Since each instrument contains a miniature diaphragm seal to protect the sensor, the fill liquid is sensitive to position.
The correct orientation is with the sensor diaphragm in the vertical phase. Slight offsets may occur in any other orientation.

4.6 CLEANING

Periodic cleaning may be necessary especially in sludge or sewage installations. Remove the transducer from its installation and immerse it in a bucket containing a mild detergent. Using a soft brush gently remove all external debris from the body of the unit.

Avoid direct contact with the process diaphragm on units with SS metallic diaphragms. Permanent failure may result if the diaphragm is damaged.

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5.0 PRODUCT RETURN & WARRANTY INFORMATION

5.1 All Sigma Controls' transducers are covered by a 12 month factory warranty against parts failure or workmanship.

All transducers are designed to be fully repairable by the factory.

5.2 REPAIRS AND RETURNS

Units which fail outside of the warranty period will be repaired or replaced with a factory refurbished unit at the discretion of Sigma Controls.

Factory refurbished units contain new sensor, 'O' rings, electronics and cable and carry a full 12 month warranty. Refurbished units cost approximately 1/3 of the cost of a new unit and can be provided with the return of a usable one.

RMA's are not required to return a unit to the factory but the unit must be cleaned prior to shipment. Units received by the factory that are in an unsanitary condition will be returned to the shipper.

All returned material must include ship and bill to information, a completed Return Authorization form (found in this manual) and completed with as much information as possible.

Factory assistance is available for field trouble shooting at 215-257-3412 (EST).

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5.3 FIGURE 1 – OUTLINE AND DIMENSION DRAWING

A) Outline and Dimensions Model 5000MP

B) Outline and Dimensions Model 6000MP/7000MP

C) Outline and Dimensions Model 6100MP

D) Outline and Dimensions Model 6200MP

E) Outline and Dimensions Model 8000MP

F) Wiring Diagrams 1 & 2

G) Application Assists

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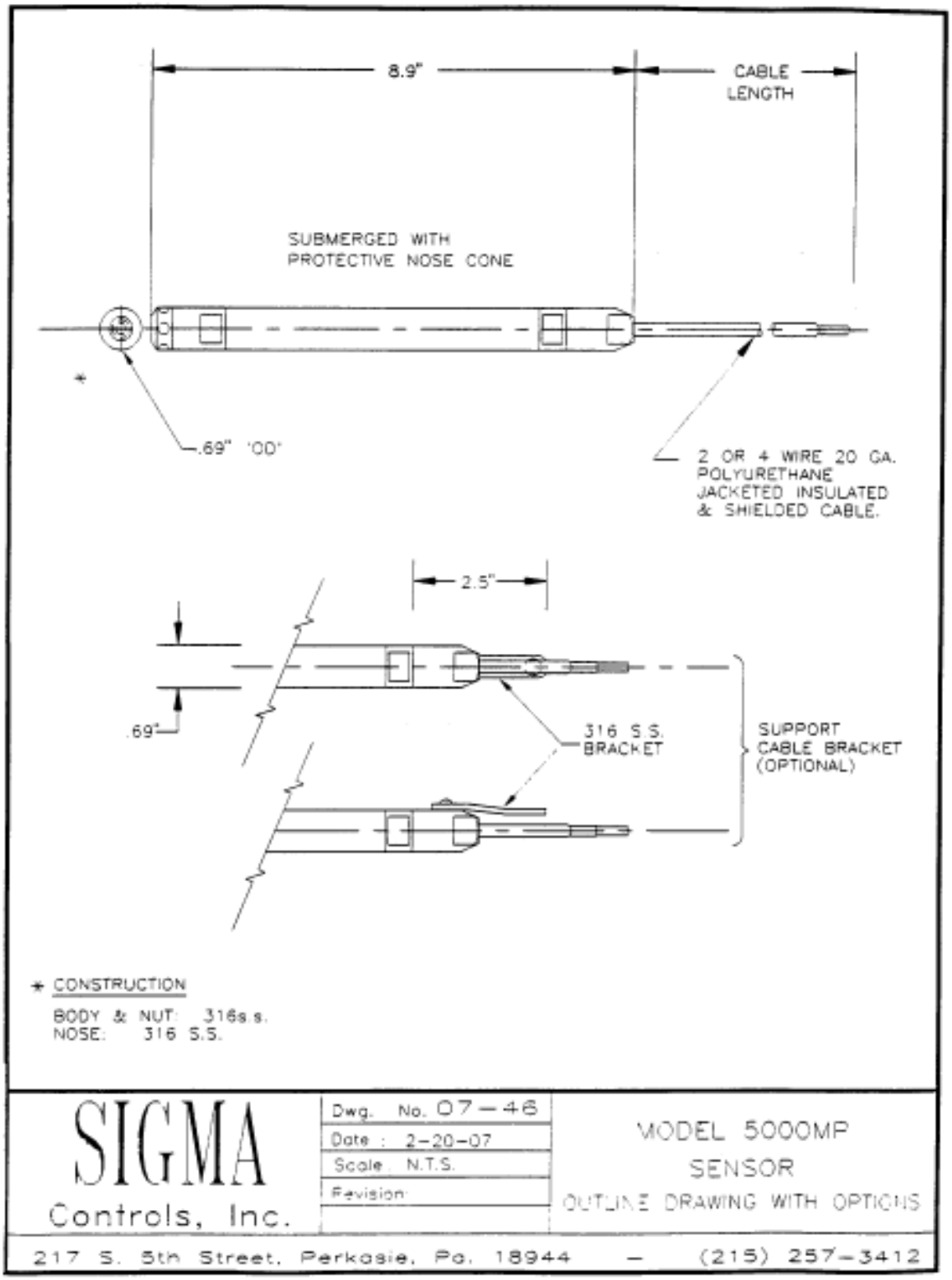
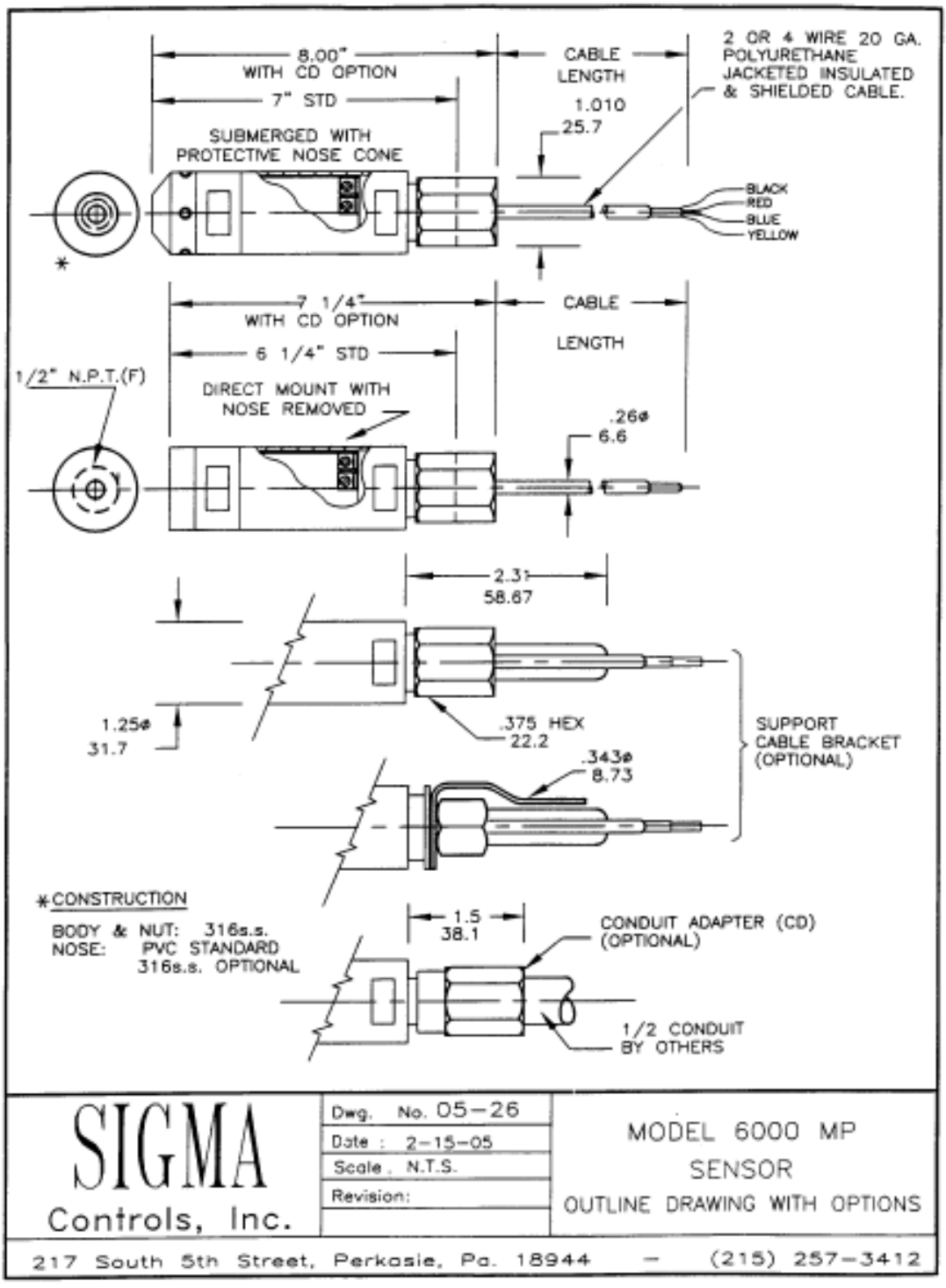
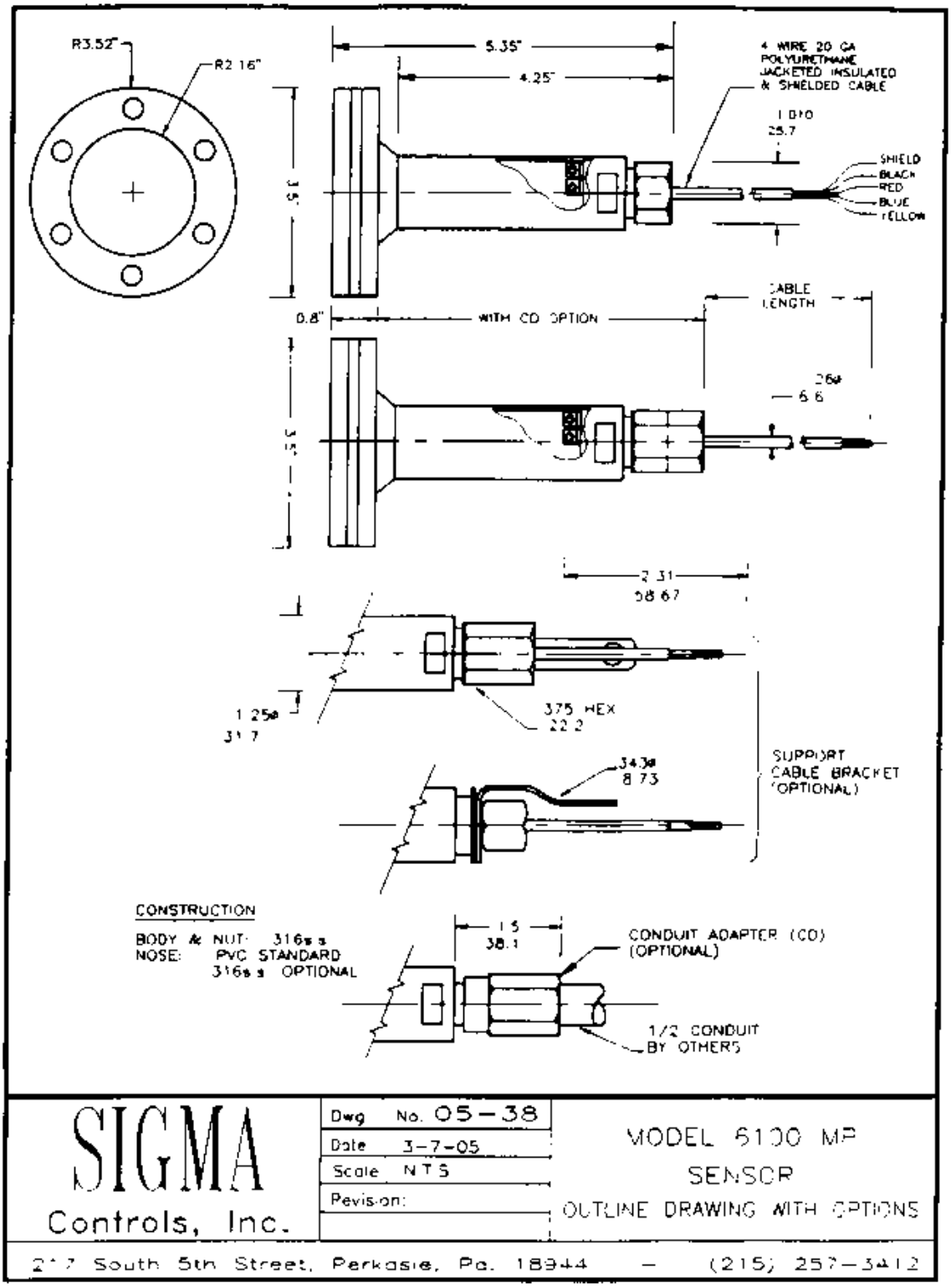
A) Outline and Dimensions 5000MP



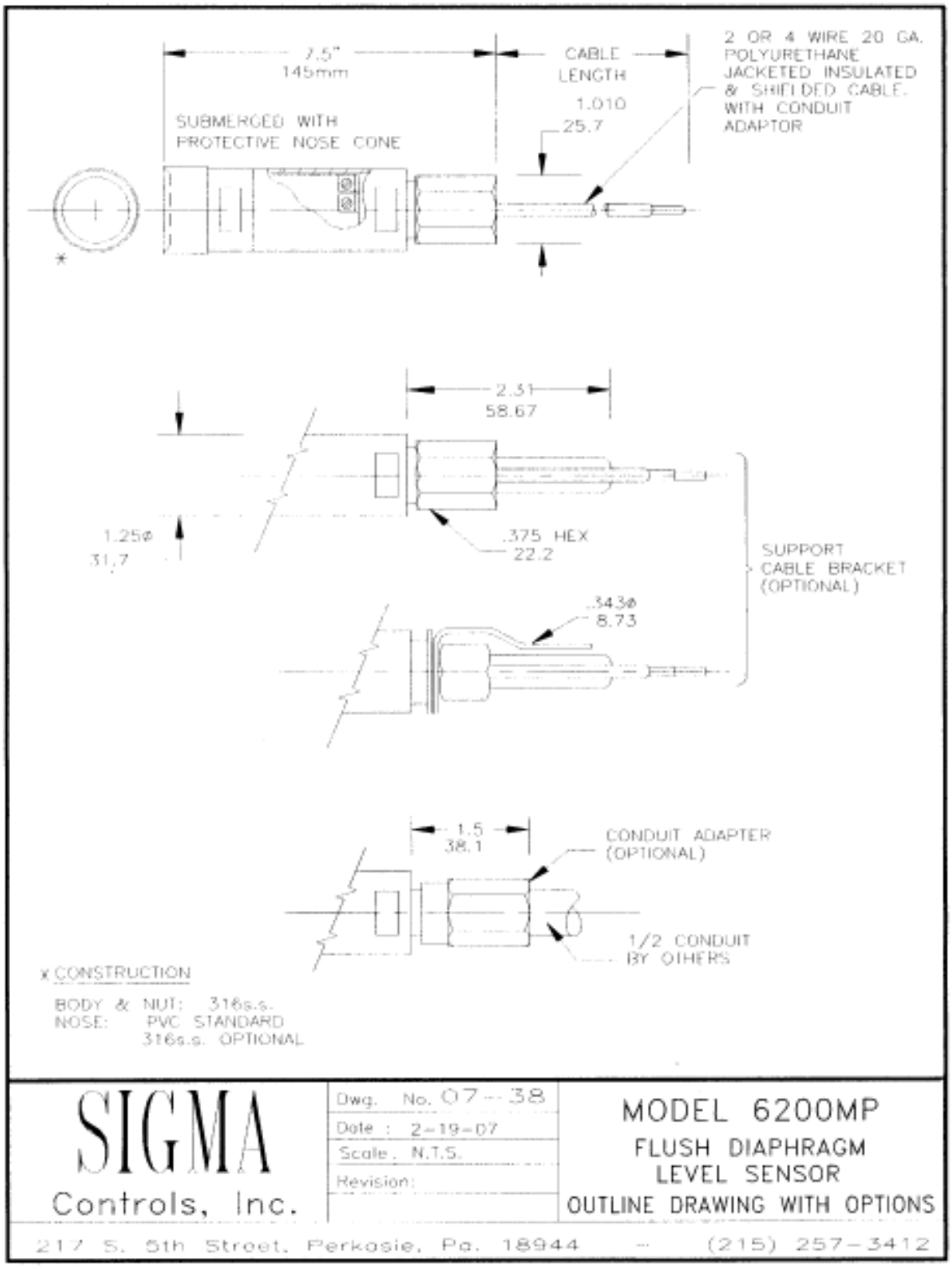
B) Outline and Dimensions Model 6000MP/7000MP



C) Outline and Dimensions Model 6100MP



D) Outline and Dimensions Model 6200MP



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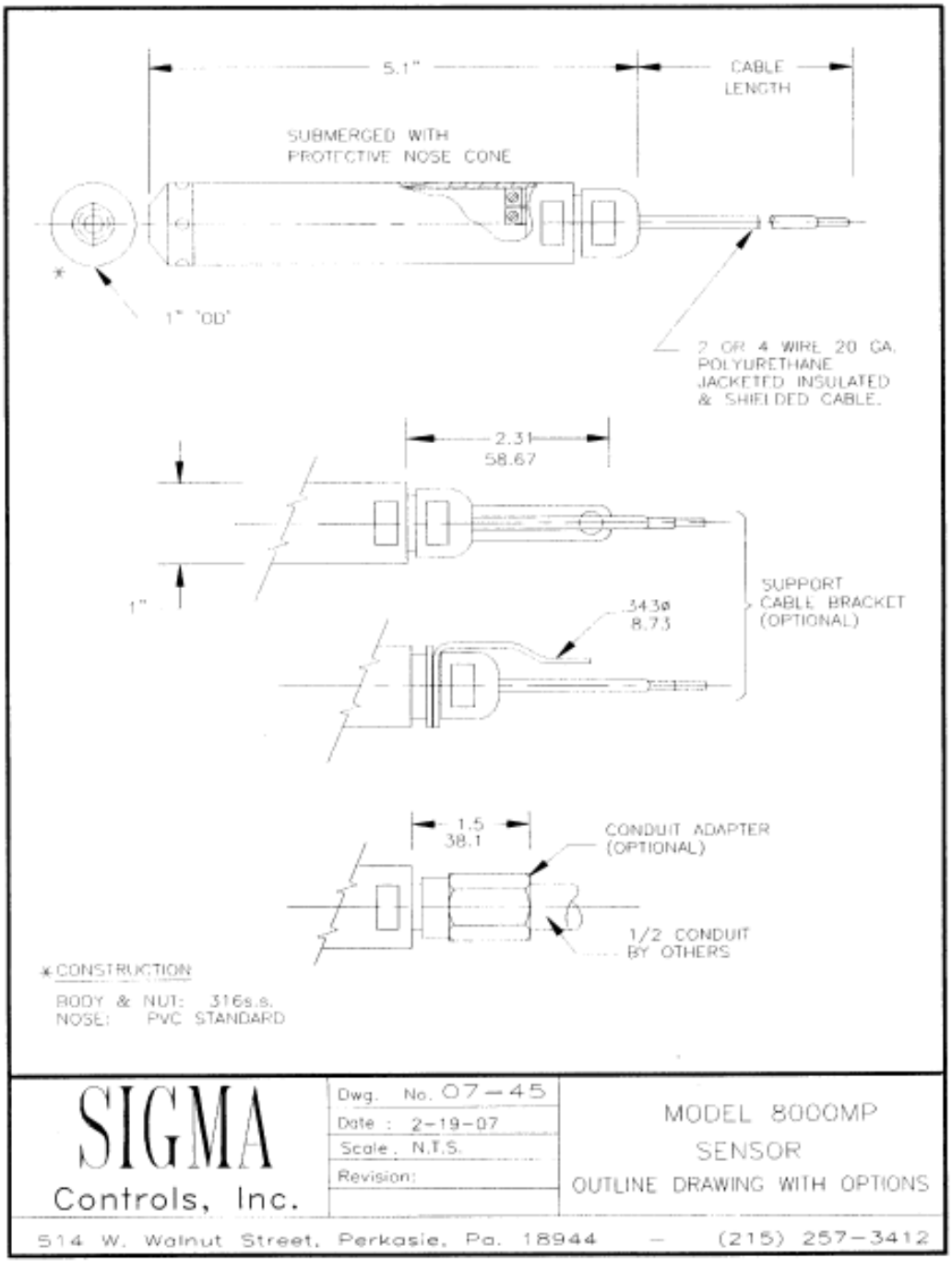
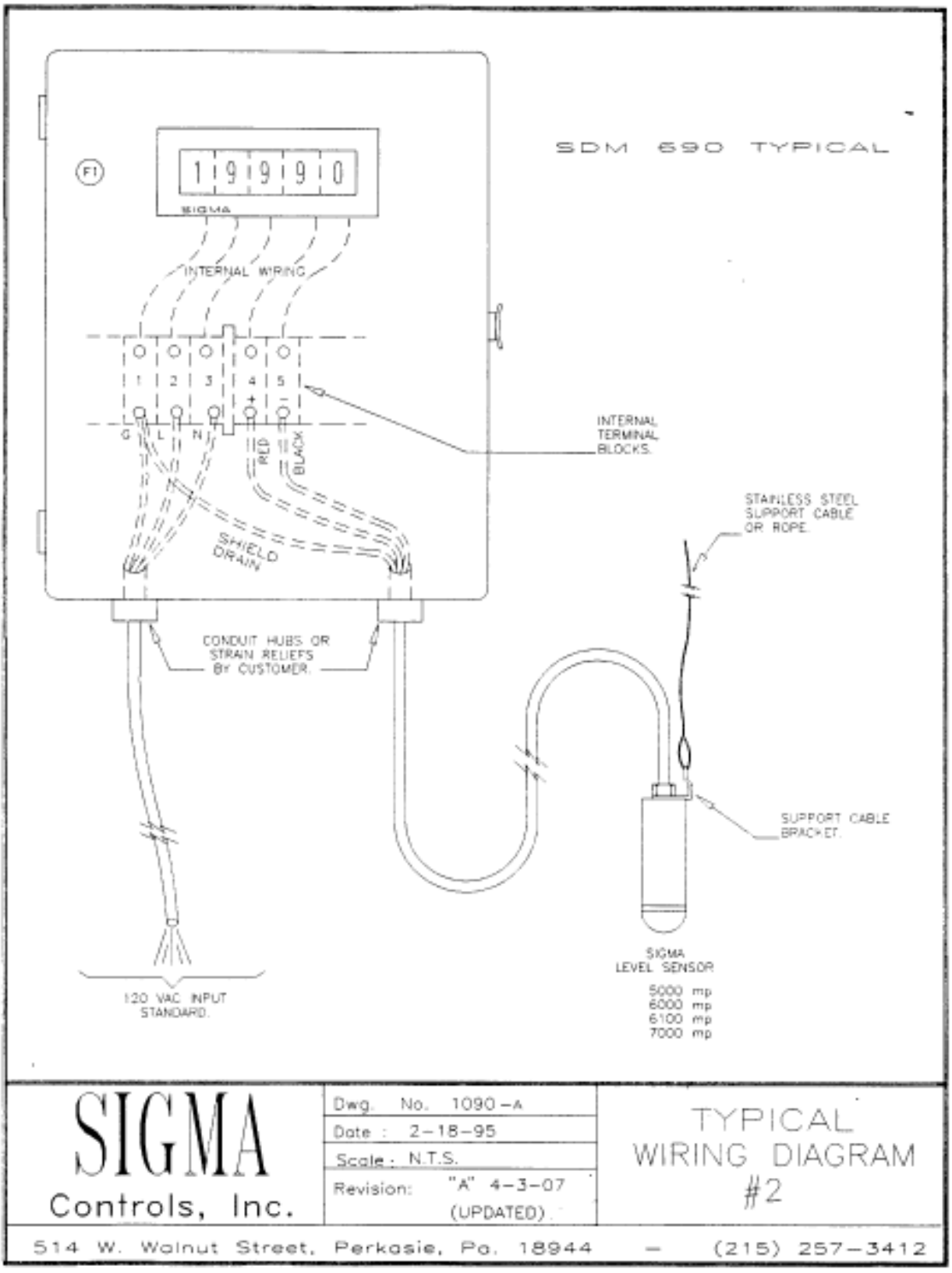
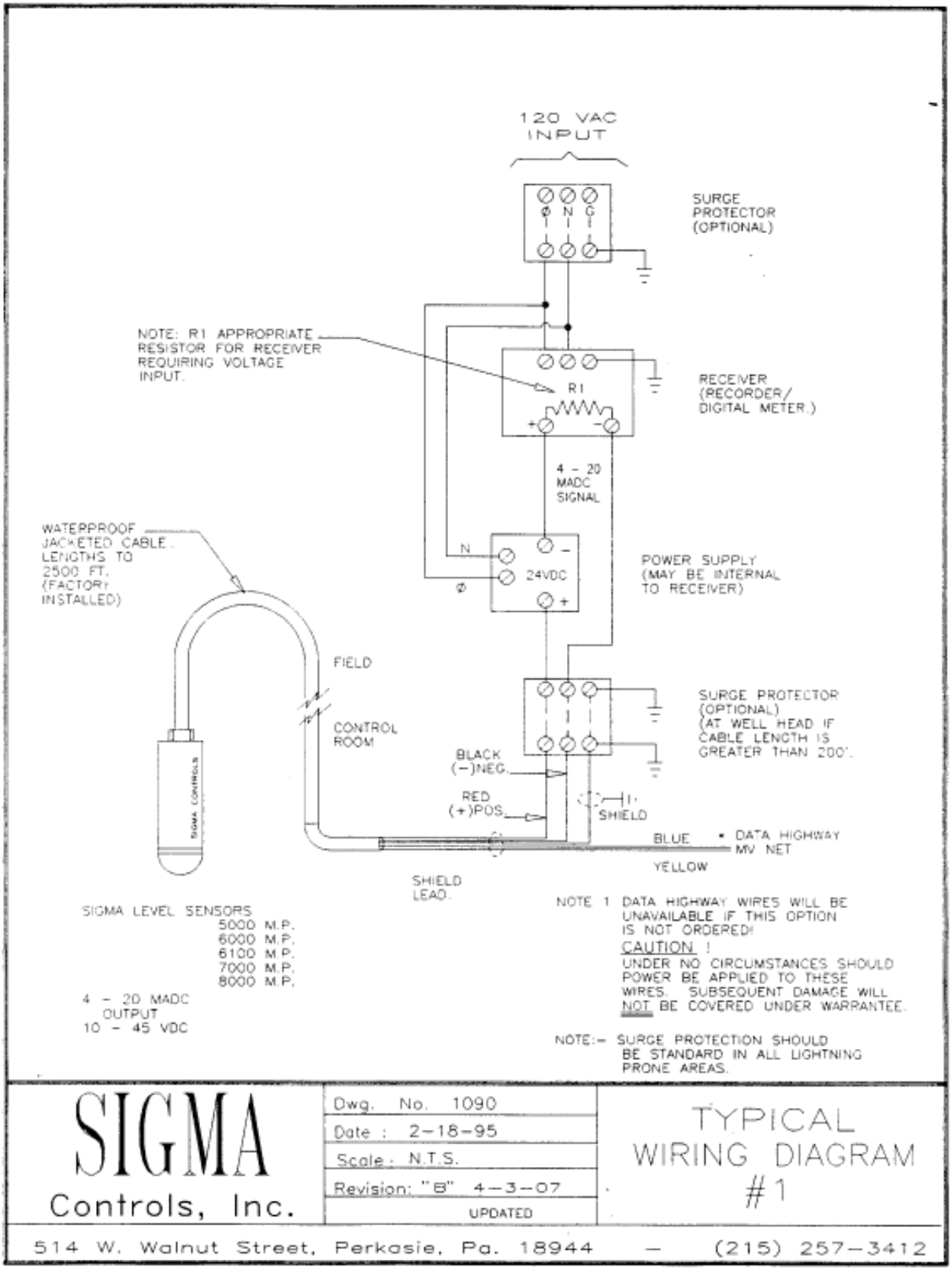


F) Wiring Diagrams





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Dwg. No. 1090	TYPICAL WIRING DIAGRAM #1
Date : 2-18-95	
Scale : N.T.S.	
Revision: "B" 4-3-07 UPDATED	

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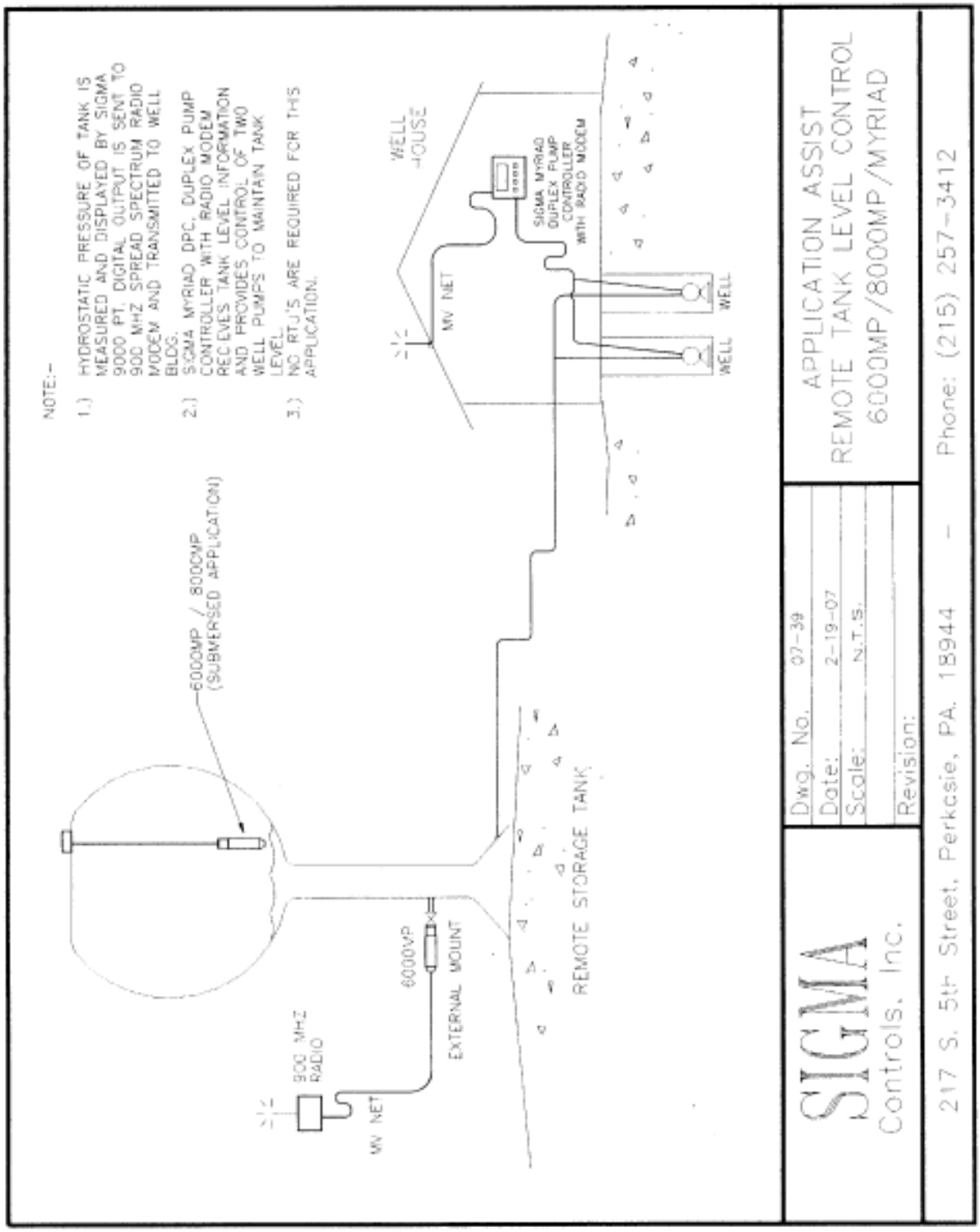
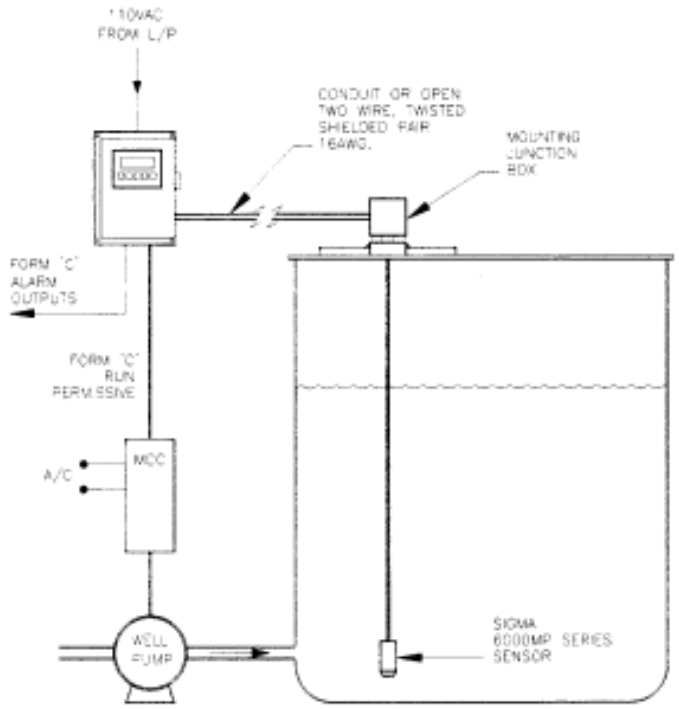
G) Application Assists


NOTE:-
1.) HYDROSTATIC PRESSURE OF TANK IS MEASURED AND DISPLAYED BY SIGMA 9000 PT. DIGITAL OUTPUT IS SENT TO 900 MHZ SPREAD SPECTRUM RADIO MODEM AND TRANSMITTED TO WELL BLDG.
2.) SIGMA MYRIAD DPC, DUPLEX PUMP CONTROLLER WITH RADIO MODEM RECEIVES TANK LEVEL INFORMATION AND PROVIDES CONTROL OF TWO WELL PUMPS TO MAINTAIN TANK LEVEL.
3.) NO RTU'S ARE REQUIRED FOR THIS APPLICATION.
6000MP / 8000MP (SUBMERSED APPLICATION)
900 MHZ RADIO
MV NET
6000MP
EXTERNAL MOUNT
REMOTE STORAGE TANK
WELL HOUSE
MV NET
SIGMA MYRIAD DUPLEX PUMP CONTROLLER WITH RADIO MODEM
WELL
WELL
SIGMA
Controls, Inc.
Dwg. No. 07-39
Date: 2-19-07
Scale: N.T.S.
Revision:
APPLICATION ASSIST
REMOTE TANK LEVEL CONTROL
6000MP/8000MP/MYRIAD
217 S. 5th Street, Perkasie, PA. 18944 - Phone: (215) 257-3412



WELL PUMP TANK CONTROL

Many commercial water wells (hospitals, colleges, etc.) pump water to a holding or distribution tank which in turn feeds the system booster pumps. Maintaining the level in this tank is critical for satisfactory system performance.

In this application a Sigma model 6000MP sensor is suspended, using the Sigma mounting junction box, in the tank top and provides a continuous tank level measurement.

The output of the Model 6000MP is connected to a Sigma Myriad LC1/LC2 display/controller which in turn is controlling the well pump and providing a low level alarm output to the building central monitoring system.

Using the adjustable 'dead-band' feature of the Sigma Myriad LC1/LC2 relay, the well pump is started at a preset low level and stopped when the tank level high setpoint is reached. A second output provides high or low level alarm output.

SIGMA Controls, Inc.	Dwg. No. 07-40 Date: 2-19-07 Scale: N.T.S. Revision:	APPLICATION ASSISTS. WELL PUMP TANK TANK CONTROL & ALARM

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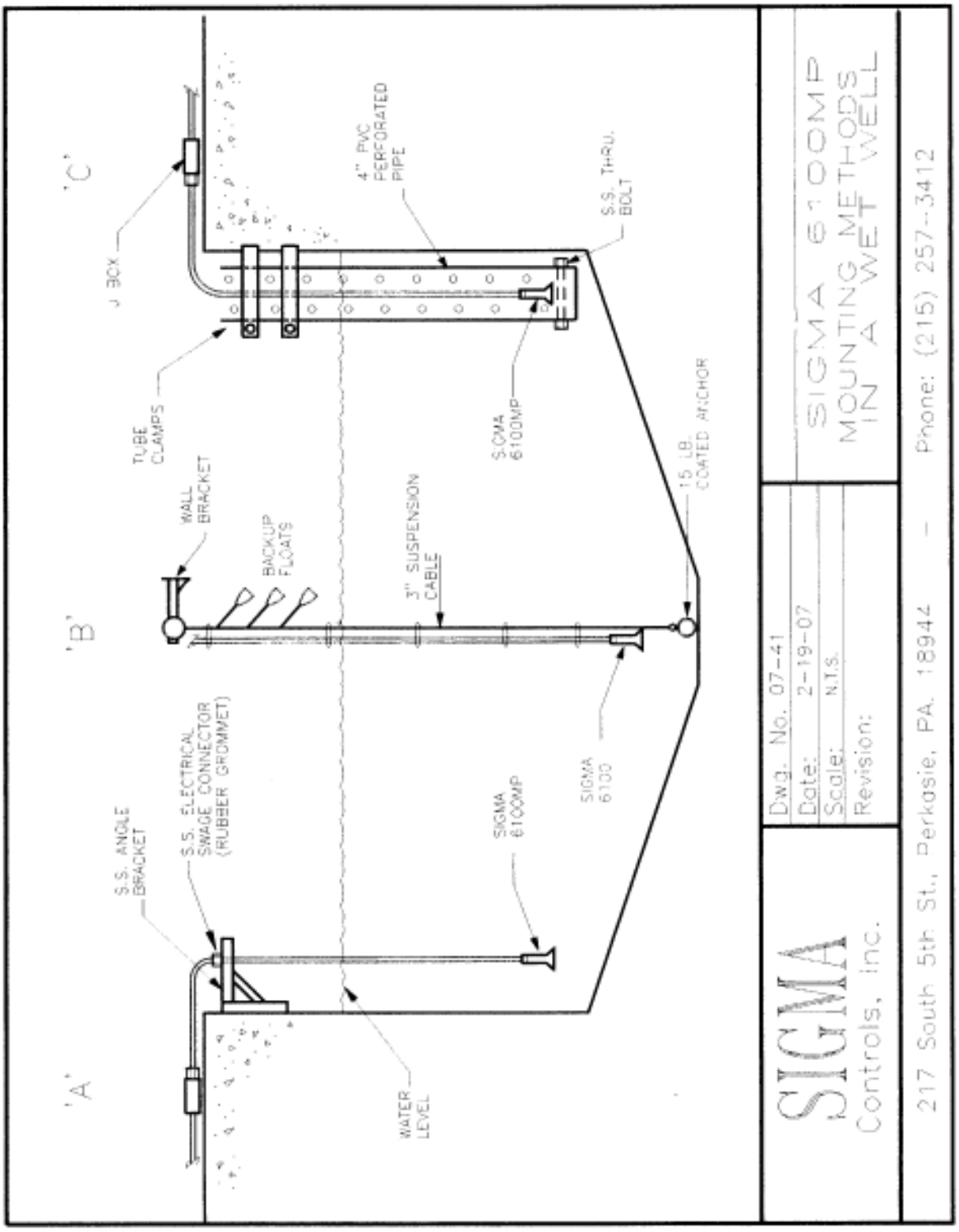
'A'
'B'
'C'
J BOX
TUBE CLAMPS
WALL BRACKET
BACKUP FLOATS
3" SUSPENSION CABLE
S.S. ANGLE BRACKET
S.S. ELECTRICAL SWAGE CONNECTOR (RUBBER GROMMET)
WATER LEVEL
SIGMA 6100MP
SIGMA 6100
4" PVC PERFORATED PIPE
S.S. THRU. BOLT
SIGMA 6100MP
15 LB. COATED ANCHOR
SIGMA Controls, inc.
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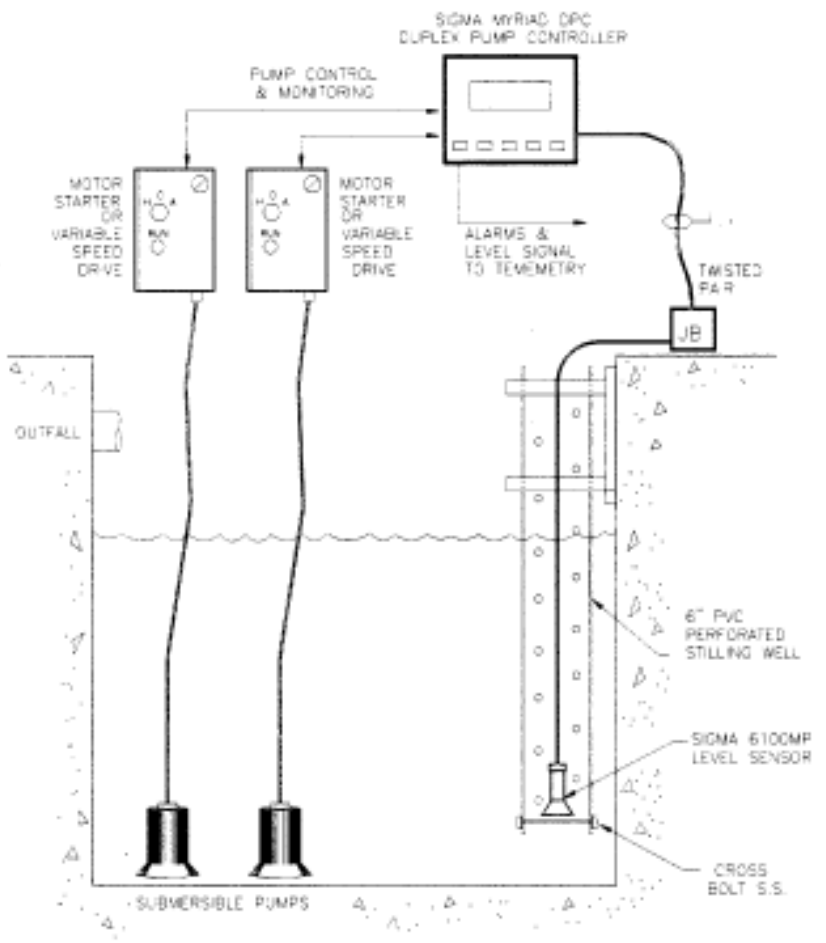
Dwg. No. 07-41
Date: 2-19-07
Scale: N.T.S.
Revision:
SIGMA 6100MP MOUNTING METHODS IN A WET WELL



LIFT STATION CONTROL WITH LEVEL SENSOR

SIGMA CONTROLS MYRIAD DPC (DUPLEX PUMP CONTROLLER) PROVIDES ALL NECESSARY LOGIC FOR THE MANAGEMENT OF TWO SEWAGE PUMPS AND WILL OPERATE CONSTANT SPEED OR VARIABLE SPEED MOTOR CONTROLS.

- LEVEL INFORMATION IN NUMERIC & BAR GRAPH FORMAT.
- LEAD/LAG SETPOINTS WITH PROGRAMMABLE ALTERNATION FOR PUMP STAGING.
- HIGH/LOW LEVEL ALARM OUTPUTS.
- 4/20 MA SPEED VERSUS LEVEL SETPOINTS FOR FLOW MATCHING WHEN USING VFDS.
- 4/20 MA RETRANSMIT OUTPUTS TO SCADA.
- MOTOR OVERTEMP/OVERLOAD AND SEAL LEAK MONITORING WITH ALARM SCREENS AND PUMP SHUTDOWN (O/TEMP. ONLY)
- ELAPSED TIMERS STANDARD.
- LEVEL SIMULATION SCREEN FOR TESTING OF SYSTEM SET POINTS.
- TREND GRAPH SCREEN FOR ANALYSIS OF PUMPING CYCLES OVER TIME.
- DIAGNOSTIC SCREEN WITH REAL TIME INPUT/OUTPUT STATUS.
- DUAL RS485 OUTPUTS FOR SCADA.
- FULLY USER PROGRAMMABLE.

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Dwg. No.	07-42
Date:	2-19-07
Scale:	N.T.S.
Revision:	

APPLICATION ASSISTS

DUPLEX PUMP LIFT STATION CONTROLS
WITH SUBMERSIBLE LEVEL SENSOR
SIGMA 6100MP

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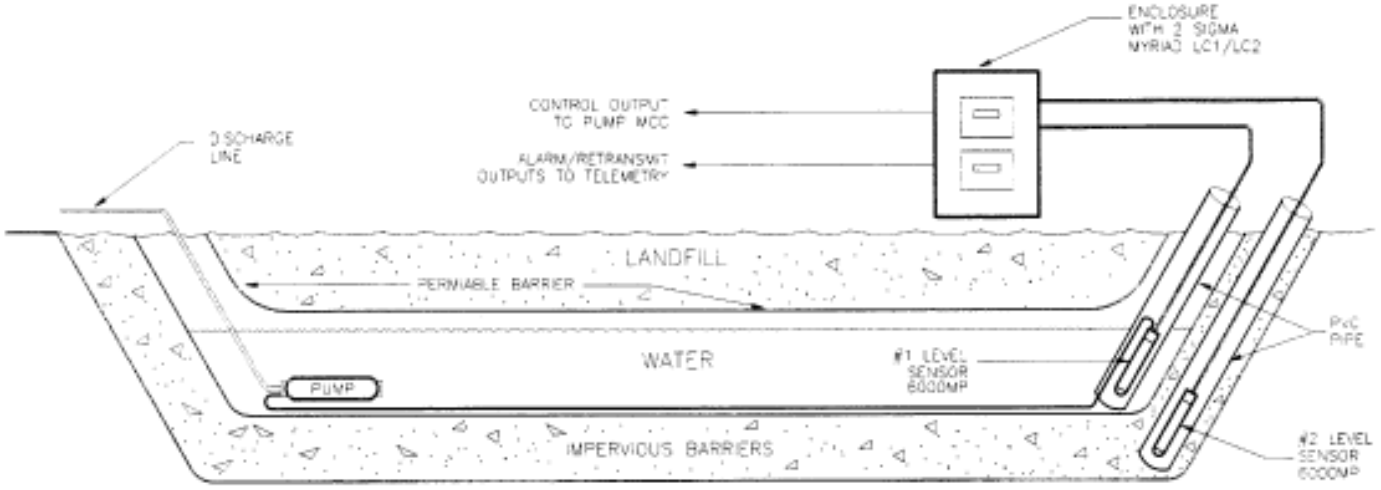

LIQUID SEEPAGE DISPOSAL AT LANDFILLS

APPLICATION: Since many landfills are made up of a series of non-permiable cells designed to hold fill, some method is necessary to monitor and contro the level of natural runoff and rainwater which accumulates in the bottom of cells. A seperate permiable barrier is located several feet inside the primary exterior wall of the cell. Both the secondary exterior barrier walls are made of impervious material to prevent any seepage. The water seeps through the permiable barrier and is collected in the space between the permeable and primary exterior barrier. The accumulated liquid must be removed. If the primary barrier is compromised the second exterior wall acts as a safety barrier to prevent any seepage into the surrounding areas.

RECOMMENTATION: Submerge Sigma Controls Series 6000MP or 7000Mp evel sensors inside large PvC pipes positioned to locate the transducers. Connect one sensor and a local submerged pump, located in the space between the permiable barrier and the primary impervious barrier, to a Sigma Controls MYRIAD LC1/LC2 level controller. The transducer sends a 4 - 20 MA signal to the meter/controller which activates the pump when pre-determined water levels are reached. The pump ejects the liquid to a holding tank or sump for further treatment and/or disposal. Connect the second sensor to a SIGMA MYRIAD LC2 digital meter with relay outputs. Should the impervious barrier be pierced and liquid clowed into the space between the two barriers, a visual and/or audible alarm will be activated.

COMMON APPLICATIONS: Environmental and polution control contractors, environmental consultants and engineers, waste management consultants, municipal government waste water treatment agencies.

SIGMA Controls, Inc.	Dwg. No. 07-43 Date: 2-19-07 Scale: N.T.S. Revision:	APPLICATION ASSISTS LEACHATE COLLECTION IN LANDFILLS

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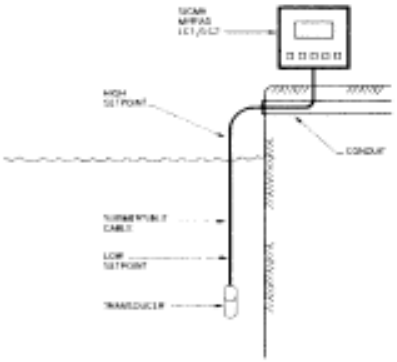
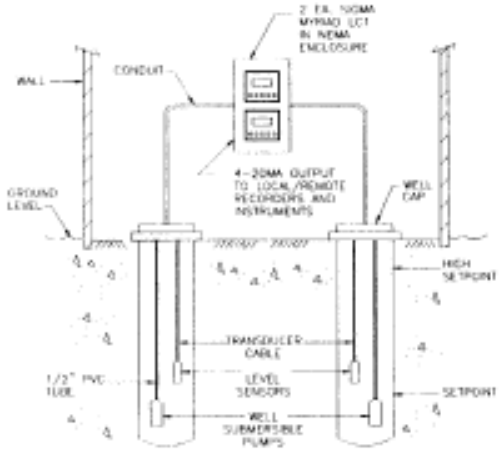


APPLICATION: To monitor and control the level in a holding pond or tank

RECOMMENDATIONS: Submerge a Sigma Controls Model 6000MP or 7000MP Level Sensor into a tank or pond. Use a Sigma Controls Model Myriad LC1/LC2 control/display meter with high/low set points programmed for pump control and enclosed in a NEMA 4 housing for maximum protection. When the high set point is tripped, the control meter will either turn the pump off or close the valve.

COMMON APPLICATIONS: Municipal water and waste water systems, power plants, chemical plants etc.



APPLICATION: To monitor and control the water level in commercial and/or private wells. As an added requirement, the entire system, including the pump and controls, is to be protected in the event of the water levels falling below the pump intake.

RECOMMENDATIONS: A Sigma Controls Model 6000MP or 7000MP Level Sensor is lowered into the well through a 1 1/2" PVC pipe. The sensor is attached to a Sigma Controls Model MYRIAD LC1/2 control/display meter with high/low setpoints which are adjusted to control the pump. The low set point is set to turn the pump off in the event that the well runs dry. An optional 4-20MA signal is available for transmission to remote locations.

COMMON APPLICATIONS: All municipalities, water authorities, power plants, commercial and private well installations, etc.

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Dwg. No. 07-44	
Date : 2-19-07	
Scale : N.T.S.	APPLICATION ASSISTS
Revision:	

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5.4 FREQUENTLY ASKED QUESTIONS

Q) How do I prevent moisture from getting into the transducer?
A) Understand the source of the problem. The sensor is often in a liquid that is significantly cooler than the one above it. On summer days, both high temperature and humidity exist at the termination end of the cable. The connection that exists between the termination and the transducer tends to 'draw' the moist warmer air into the instrument where it condenses and eventually causes premature failure.
Use of the Sigma RDE enclosure will often prevent this from happening. In any case, always use Nema 4X junction boxes whenever a junction occurs.

Q) I have had several transducers fail due to surge/lightning damage. How can this be avoided?
A) Always make sure that the cable shield is grounded. Use transient suppressors whenever possible.

Q) How long does it take to repair a unit?
A) If you opt for a refurbished unit, it can often be shipped the same day that you call. If not, normal repair can take 2 weeks or more.

Q) What happens if a transducer becomes frozen in its liquid?
A) Its hard to tell! If ice has contacted the diaphragm, it may have damaged it and an offset could result. The only way to tell is to thaw it out and perform a pressure check.

Q) Can I use the MP transducer as an RTU to transmit via radio?
A) Yes. The RS485 data output can be connected directly to most spread spectrum (900MHZ) radios without the need for a local RTU. Consult factory for information.

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Q) Can I get level (pressure) and temperature information from the MP product?

A) Yes, this is available when using the ASCII form of digital output. Consult factory.

Q) Can multiple transducers be interconnected to form a network for remote wiring?

A) Yes, up to 256 transducers can communicate over the RS485 network and be monitored by Sigma's 'Infilink' software or via MODBUS®.

Q) Which model should I use?

A) **MODEL 6100MP** is the standard in wastewater. It has a large sensing surface. It is rugged and handles turbulent processes well. It should be used where are present in the liquid.

MODEL 6200MP also has a large sensing surface but not as large as the 6100. It is a more cost effective alternative to the 6100. It should be used where solids are present in the liquid and the 6100 cannot be used because of available space.

MODEL 6000MP is the standard in clear wells (drinking water wells, ponds, tanks, lakes, etc.). It has a 1.25" thickness. It is rugged and has a thick stainless steel body. It should be used where width is not an issue.

MODEL 8000MP is for use in many submersed applications. It is very accurate and it is temperature compensated from 0 – 50° C. It has a 1.00" diameter. It has a stainless steel body. It should be used where the temperature of the liquid varies or where high accuracy is desired.

MODEL 5000MP is a very small diameter sensor for use in water wells. It has a .690" thickness. It has a stainless steel body. It should be used where the width of the 6000 and 8000 are too large.

MODEL 7000MP is the same as the 6000 except it is made of PVC. It has a 1.25" thickness. It is compatible with many liquids that stainless steel is not. It should be used where stainless steel is not chemically compatible with the liquid to be measured.

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Q) What does the “MP” part of the model number mean?
A) **MICROPROCESSOR BASED ELECTRONICS**. As opposed to analog circuitry. The MP units measure temperature as well as pressure. This allows the output to be kept within tolerance over a 0-50° C range. The MP boards are capable of digital communication with other devices. Communication options must be selected when ordering.

Q) How do I mount it?
A) There are several options available depending on the model. These are the most common:

Most of our sensors are installed by hanging the unit by its cable. Often a strain relief is used so that the cable is not crimped at the hanging point. It is not uncommon to hang a sensor 500 feet down a well with no additional support other than the cable.

SB Option – The cable support bracket is attached to the sensor. Stainless steel cable is attached to the bracket and run along side of the submersible cable. This allows the sensor to be pulled up by the stainless steel cable. This prevents the sensor from being separated from the cable when being removed from an installation where the sensor may be restricted. SB options must be selected when ordering.

CD Option – The conduit adapter allows the sensor cable to be run inside conduit while rigidly holding the sensor in place. ½” conduit with a male threaded end or fitting is screwed into the top of the sensor. The conduit can be mounted using standard electrical hardware. CD options must be selected when ordering.

SO Option – The standoff adapter allows the Model 6100MP to be elevated from the floor. The whole assembly can then be set on the floor of the pit. SO options must be selected when ordering.

Q) How do I test if my sensor is working?
A) Sigma sensors connected to user-supplied indicating and/or controlling equipment.

1) Equipment does not turn on:
   a) Check for proper supply voltage to the indicator/controller (120VAC, 240VAC , or other).
   b) Check fuses, if any.
   c) Check wiring terminations.

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2) Equipment operates, but no level is indicated, or indicated level is totally incorrect:

a) Check polarity of sensor leads, red to positive terminal, black to negative.
b) Test for DC voltage across sensor lead connections, minimum 13VDC, nominal 24VDC, maximum 45VDC.
c) Determine input signal required by equipment. 4-20ma, 1-5VDC, or 1-10VDC.
d) Lift sensor several feet in well. Does the indicated level change?
If yes, equipment not calibrated for the range of 4-20Ma output of the sensor. Check sensor calibration sheet supplied with manual. Recalibrate equipment.
If no, possible wiring errors, see manual open surge protector, damaged sensor.

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Sigma Controls, Inc.
PROCESS CONTROLS AND INSTRUMENTATION

WARRANTY

All Sigma Controls, Inc. products are warranted to be free from defective materials and workmanship for one (1) year from date of shipment. Sigma reserves the right to repair or replace at its option any product found to be defective. In no event shall Sigma Controls, Inc. be liable for any consequential, incidental, or special damages and the limit of its liability shall not exceed the purchase price of the supplied equipment.

*******IMPORTANT*******

SENSORS AND CABLE THAT HAVE BEEN USED IN WASTE WATER OR HAZARDOUS LIQUIDS MUST BE THOROUGHLY CLEANED BEFORE RETURNING. UNITS RETURNED UNCLEANED WILL BE CONSIDERED UNREPAIRABLE AND RETURNED TO SENDER OR DISCARDED. NOTE: DO NOT SUBMERGE UNITS FOR CLEANING WITH CABLE CUT OR REMOVED. THIS WILL ALLOW CLEANING FLUID TO ENTER HOUSING, DAMAGING ELECTRONICS AND VOIDING THE WARRANTY.

RETURN FOR REPAIR POLICY (WARRANTY/NON-WARRANTY REPAIR)

Return status can be determined upon factory inspection of returned equipment.

A completed Return Authorization form must accompany all items returned for repair.

Repairs will be evaluated as quickly as possible. Cost for non-warranty repairs will be provided before repairs are initiated and repairs will be

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RETURN AUTHORIZATION

*******IMPORTANT RETURN/REPAIR INFORMATION*******
SENSORS AND CABLE THAT HAVE BEEN USED IN WASTEWATER OR HAZARDOUS LIQUIDS MUST BE THOROUGHLY CLEANED BEFORE RETURNING. UNITS RETURNED UNCLEAN WILL BE CONSIDERED UNREPAIRABLE AND RETURNED TO THE SENDER OR DISCARDED.
NOTE: DO NOT SUBMERGE UNITS FOR CLEANING WITH CABLE CUT OR REMOVED. THIS WILL ALLOW CLEANING FLUID TO ENTER HOUSING, DAMAGING ELECTRONICS AND VOIDING THE WARRANTY. (SEE WARRANTY FOR FURTHER DETAILS.)

User Company Name & Address:	Name & Phone # to contact for information:

Reason for Return:	Possible Cause of Problem:

If Sensor and Cable, specify material in which equipment was installed. (This will insure proper handling in case liquid has entered sensor body.)

Urgency of Repair:
Calibration desired for sensor or meter:
PO # for Non-Warranty Repairs:
M.S.D.S. if applicable:

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PROCESS CONTROLS AND INSTRUMENTATION

MP SENSOR RS485 MODBUS CONNECTIONS

1/12/2012

VARIABLES

ADDRESS	DESCRIPTION	RANGE	DISPLAY AS	
30001	READING IN UNITS	0-32676	XXX.XX UNITS	READ ONLY
30002	CALCULATED MILLIAMPS	0-2000	XX.XX ma	READ ONLY
30003	SENSOR TEMP [C]	0-1000	XXX.X °C	READ ONLY
30004	% OF FULL SCALE	0-10000	XXX.XX %	READ ONLY
30005	UNITS AT 4ma	0-32676	XXX.XX UNITS	READ ONLY
30006	UNITS AT 20ma	0-32676	XXX.XX UNITS	READ ONLY
30007	MAX SENSOR PRESSURE	0-32676	XXX.XX PSI	READ ONLY

WARNING: SETTING VALUES OUT OF LIMITS OR WRITING TO ADDRESSES NOT MENTIONED HERE CAN CAUSE ERRATIC OPERATION. WRITING TO THESE VALUES SHOULD ONLY BE DONE BY QUALIFIED PERSONEL, WITH CAUTION. IT IS RECOMMENDED TO POLL THESE PARAMETERS IN READ ONLY MODE.

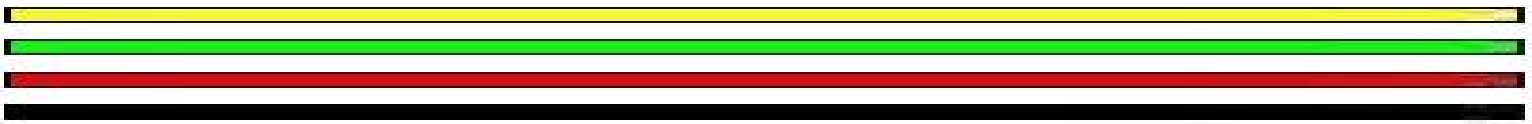
COMPATIBILITY

THE SIGMA RS485 MODBUS NETWORK USES A 4 WIRE CABLE BASED ON A STANDARD TELEPHONE CABLE. THE PINOUT HAS BEEN SELECTED SO THAT IT CLOSELY MATCHES THE COLORING ON THE SIGMA SUBMERISBLE CABLE. THIS NETWORK IS NOT COMPATIBLE, NOR SHOULD IT BE CONNECTED TO SIGMA MVNET RS485 CONNECTIONS OR LEGACY MP SENSORS. THEY CAN BE USED WITH MYRIAD FIRMWARE VERSION 3.0 AND UP

COMMUNICATION SETTINGS

19200 BAUD [FIXED]
8 DATA BITS [FIXED]
1 STOP BIT [FIXED]
NO PARITY [FIXED]
MODBUS ID (NODE) IS SET TO 5 AT THE FACTORY. IT IS SELECTABLE WITH CALMATE.

CABLING



RED = +24VDC (OPTIONAL), BLACK = -24VDC / COMMON, GREEN = + RS485, YELLOW = -RS485

MP SENSOR

YELLOW = (-) RS485
BLUE = (+) RS485
RED = (+) 24VDC
BLACK = (-) 24VDC

SIGMA CONTROLLER

YELLOW = (-) RS485
GREEN = (+) RS485
RED = (+) 24VDC (NOT USED)
BLACK = (-) 24VDC